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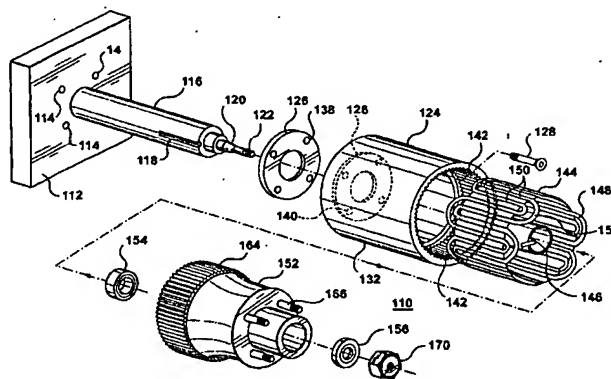
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(54) Title: HARMONIC DRIVE MOTOR



(57) Abstract: A core for a flexispline motor is enclosed within a distortable flexispline having the shape of an open tin can, such that under rest conditions the space between the flexispline and the core is constant. The core of the motor is shaped as in a hub and spoke configuration, with spokes having variable widths. Coils are fitted to the spokes and are connected in pairs such that pairs of coils on opposing spokes are in series bucking relationship. A second set of coils, which overlap the first coils, can be connected in a non-bucking manner to increase the magnetic flux produced by the coils on opposing spokes. The flexispline has a flexible ring gear incorporated in its surface near the open end which when magnetically attracted ceases to have a circular shape and forms a two-lobe (elliptical) or three-lobe shape. Under these conditions the corresponding points of the shape so formed contact a ring gear which is mounted on a rotating hub. The points of the flexible ring gear which correspond to the minor axes contact the surface of the core. As the magnetic force rotates the distorted shape rotates, but the flexispline itself does not rotate. Because the number of teeth on the ring gear and the flexible gear are different, the hub is forced to rotate at reduced speed. An alternative construction embodies a splined locking arrangement to rotatably fix an open cylinder, composite material flexispline to the electromagnetic core. Other concentric pairs of inner and outer electromagnetic winding arrangements achieve pull-in pull-out flexispline distortion of elliptical or three-lobe shape.

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